

Overview of NCHRP Synthesis 332

Access Management on Crossroads in the Vicinity of Interchanges

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KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

Here it is!

NCHRP

SYNTHESIS 332

**Access Management on
Crossroads in the Vicinity
of Interchanges**

A Synthesis of Highway Practice

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM



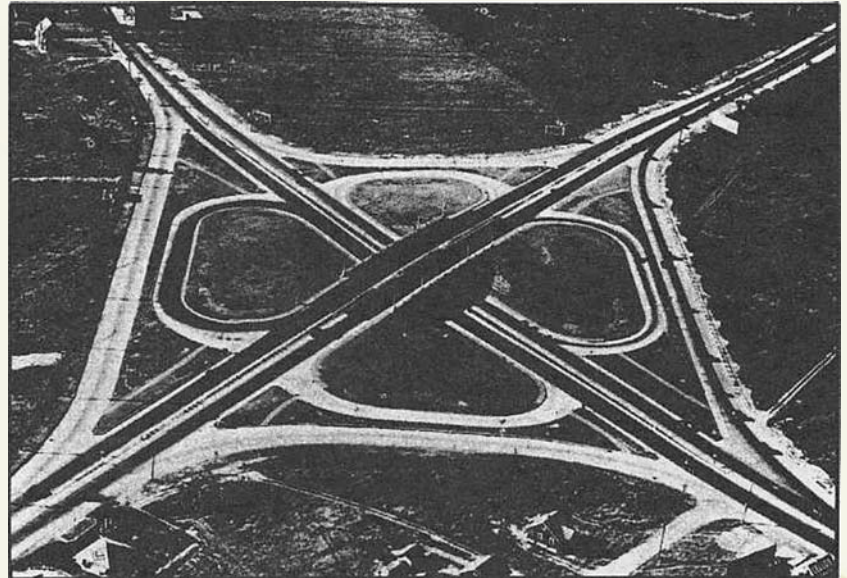
Synthesis Overview

- **Literature Review**
- **Existing Agency Programs**
 - States, provinces, toll authorities & local agencies
 - Spacing standards
 - Factors influencing access location spacing
 - Spacing measurement
 - Access management techniques
 - Planning, operation, and design practices
- **Case Studies**
 - New interchanges
 - Retrofit interchanges
- **Findings**



Background

- **Interchange Crossroads vs. Traditional Spacing**
- **History**
 - First attempt (1928)
 - Many additional attempts (Interstate System)
 - Re-attempts (Today)



Reference: A Policy on Geometric Design of Rural Highways (AASHTO)

State of the Practice

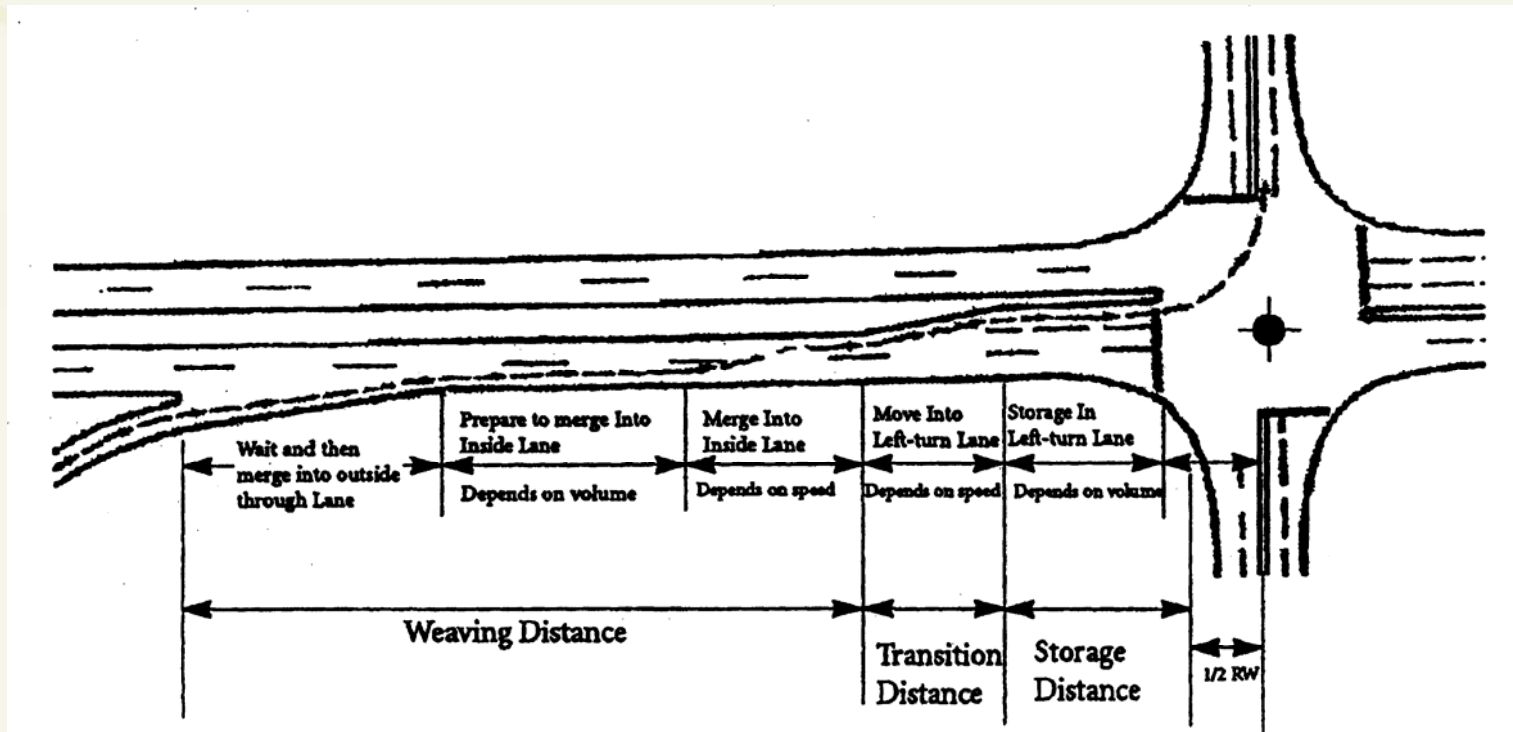
- **Access Management Policy**

- AASHTO Green Book – *“the appropriate degree of access control or access management depends on the type and importance of an arterial”*
- 1991 A Policy on Design Standards – Interstate System – *100 feet (urban) / 300 feet (rural)*
- NCHRP Report 420
- TRB Access Management Manual
- State policies, guideline, standards and programs



State of the Practice (cont.)

- Access Management Techniques
- Recommended Access Spacing Components



Reference: NCHRP 420: Impacts of Access Management Techniques

State of the Practice (cont.)

Type of Area	Spacing Dimension			
	X	Y	Z	M
Fully developed urban ^a	750 ft (230 m)	2640 ft (800 m)	990 ft (300 m)	990 ft (300 m)
Suburban/urban	990 ft (300 m)	2640 ft (800 m)	1320 ft (400 m)	1320 ft (400 m)
Rural	1320 ft (400 m)	2640 ft (800 m)	1320 ft (400 m)	1320 ft (400 m)

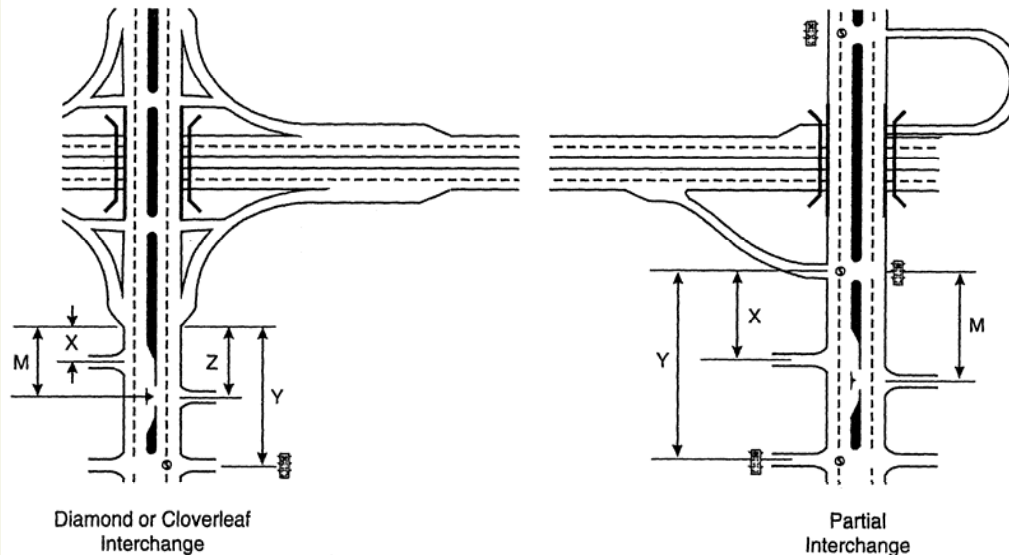
X = distance to first approach on the right; right in/right out only.

Y = distance to first major intersection. No four-legged intersections may be placed between ramp terminals and the first major intersection.

Z = distance between the last access connection and the start of the taper for the on-ramp.

M = distance to first directional median opening. No full median openings are allowed in nontraversable medians up to the first major intersection.

^a Free-flow ramps are generally discouraged in fully developed urban areas and are questionable in suburban/urban areas because pedestrian and bicycle movements are difficult and potentially dangerous.



Reference: Access Management Manual (TRB)

State of the Practice (cont.)

- **Impacts of Access Management Practices**
 - Operational benefits
 - Safety impacts
 - Economic vitality
- **Implementing Programs**
 - Creation
 - Intergovernmental coordination
 - Legal authority for implementation
 - Education



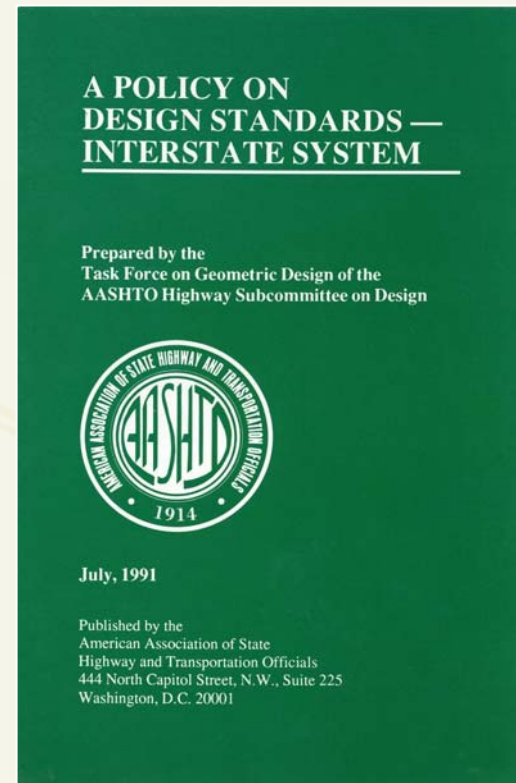
Survey of Existing Programs (April 2003)

- Survey included state DOTs, provinces, toll authorities & local agencies
- Good response rate (62%)
- Nearly 90% attempt to manage access
- 75% of the agencies documented standards for crossroads
- Less than 50% have their standards adopted by regulation
- Only 9 agencies have adopted legislation
- Only 60% have an integrated approach to operations and safety



Management & Spacing Standards on Crossroads

- Minimum requirements vary from 100 to 750 feet and depend on multiple factors
- Most restrictive requirements range $\frac{1}{4}$ - to $\frac{1}{2}$ -mile
- Eleven states require 100 feet

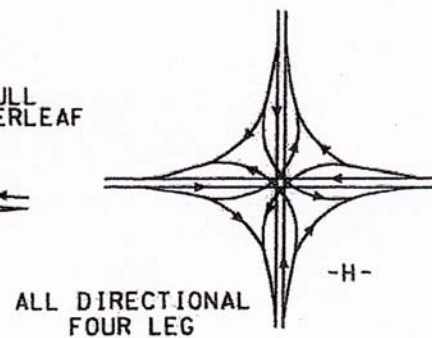
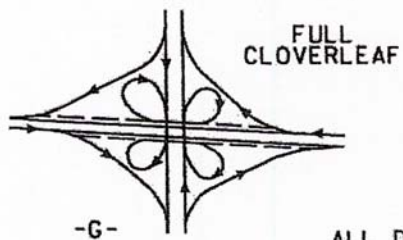
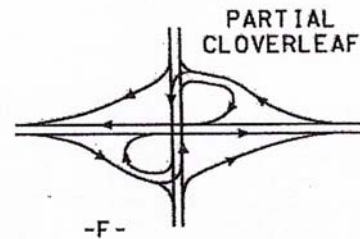
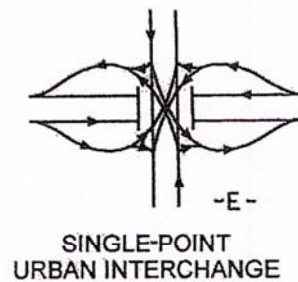
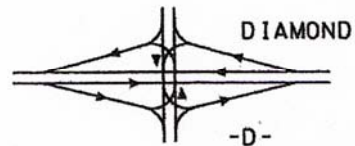
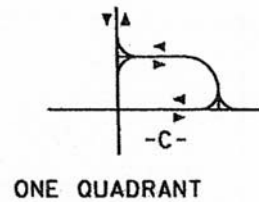
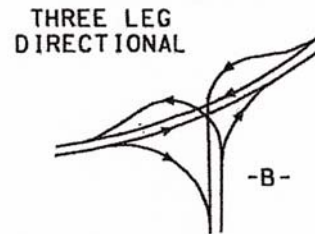
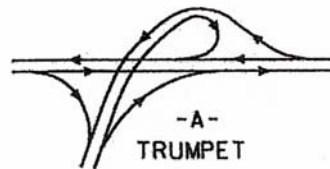


Factors Influencing Access Spacing

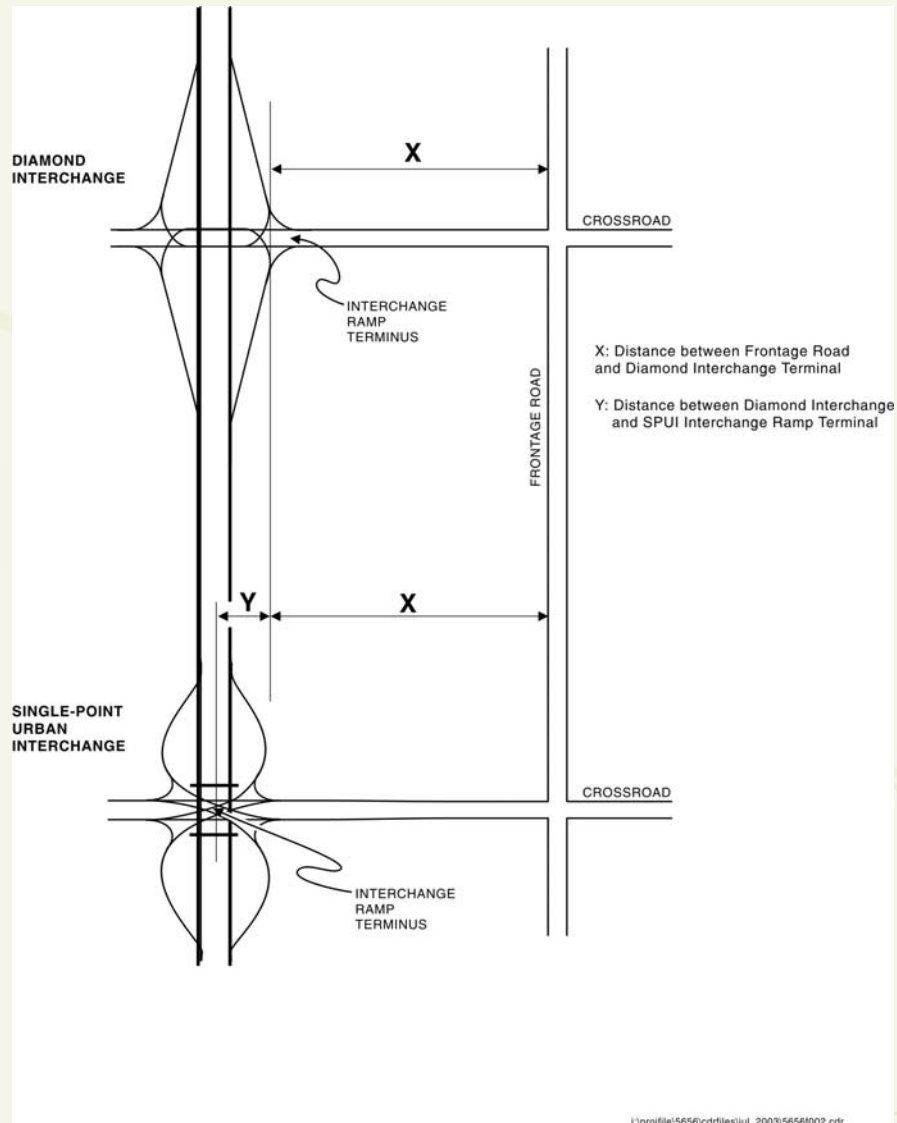
- Surrounding land use and environment
- Roadway classification
- Interchange form
- Public and private accesses
- Type of downstream access point
- Downstream storage requirements
- Cross section
- Design speed
- Volume
- Signal cycle length
- Cost and economic impacts
- Level of interchange importance
- Crossroad jurisdiction



Interchange Form



Interchange Form (cont.)



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Factors Influencing Access Spacing

- **Public and private accesses**



Type of Downstream Access Point

- Right-in
- Right-in/right-out
- Left-in/right-in/right-out
- Full access (Unsignalized)
- Full access (Signalized)

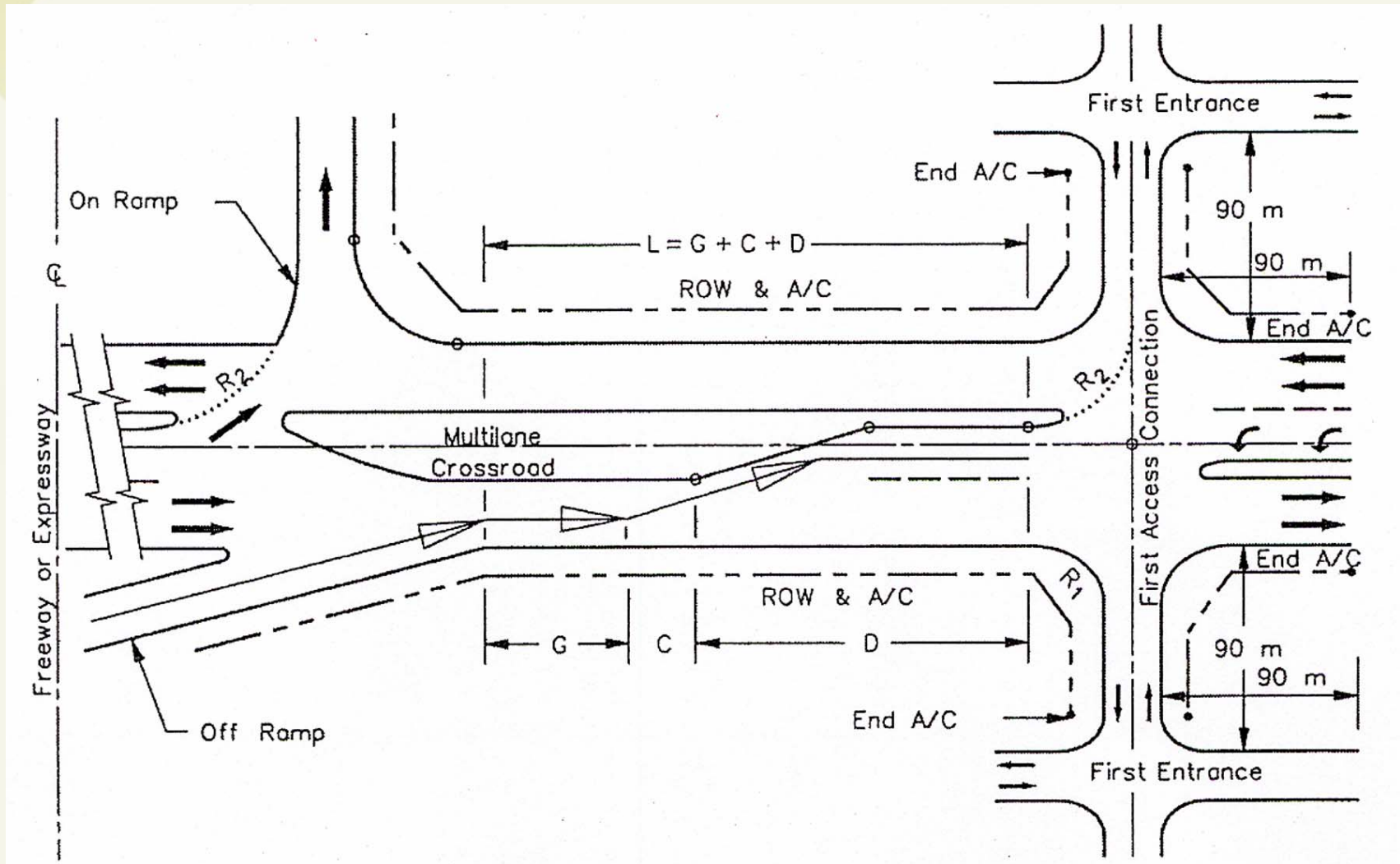


Factors Influencing Access Spacing

- **Downstream storage requirements**



Cross-Section

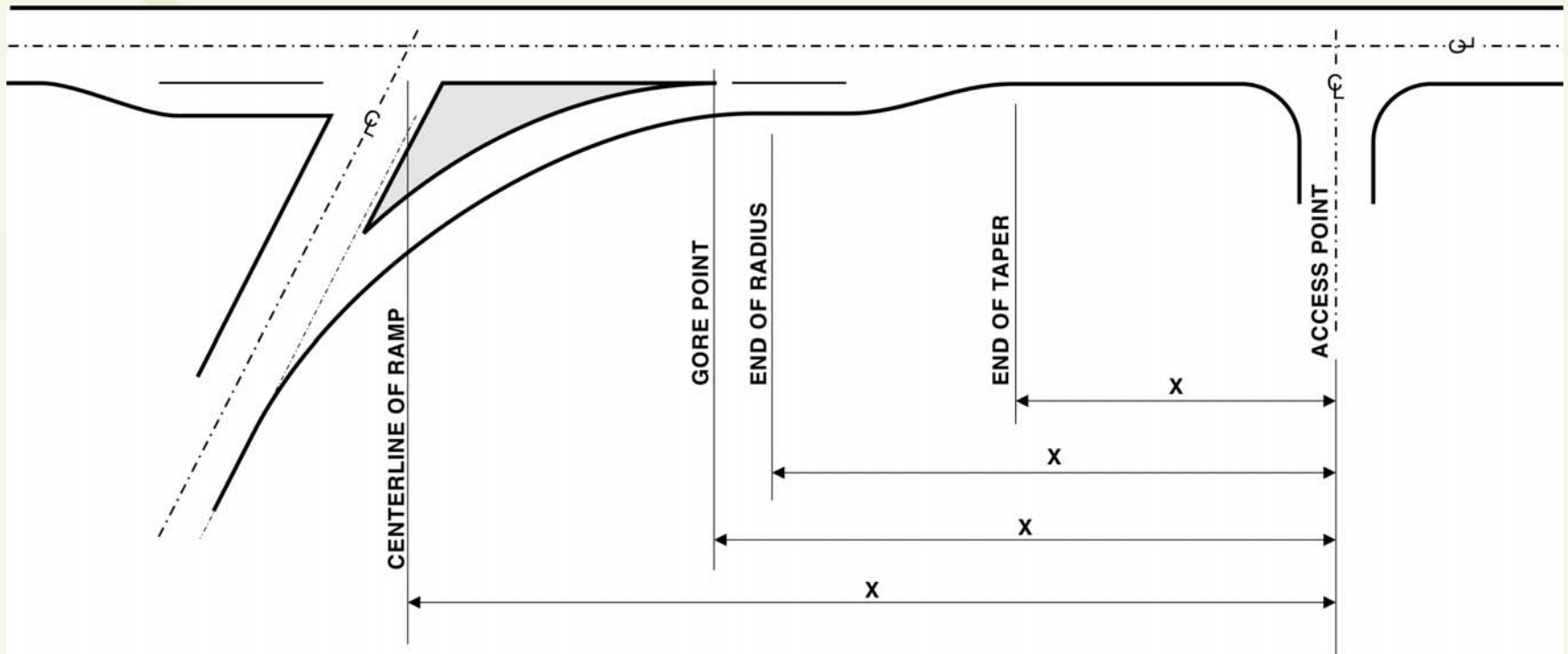


Factors Influencing Access Spacing

- **Design speed**
- **Volume**
- **Signal cycle length**
- **Cost and economic impacts**
- **Level of interchange importance**
- **Crossroad jurisdiction**



Spacing Measurement on Crossroads



Access Management Techniques Used on Crossroads

- **Positive control**
- **Acquisition**
- **Legislation and regulation**
- **Intergovernmental coordination**
- **Land use**
- **Local agency regulations**
- **Planning**
- **Operations**
- **Design**



Planning Techniques

- **NEPA Process**
- **Access Management Plans**
- **Circulation Plans**
- **Interchange Access Management Plans**
- **Interchange Area Management Plans (IAMPs)**



Operation Techniques

Agency	LOS	V/C	Travel Time	Queues	Weaving	Progression
California	X					
Florida	X	X		X		X
Kansas	X			X	X	X
Louisiana	X			X		X
Nevada	X					X
New York	X	X				
Oregon		X		X	X	X
South Carolina	X			X		X
South Dakota	X		X	X		X
Texas						X
Washington	X			X		X



Design Techniques

Georgia DOT Median Treatments for all Multi-Lane Facilities

Crossroad Volume (ADT)	Median Treatment
< 18,000 ADT	Traversable Two-Way Left-Turn Lanes
18,000 to 24,000 ADT	Traversable Two-Way Left-Turn Lanes maintaining ROW for a future 20-foot raised non-traversable median
> 24,000 ADT	Non-Traversable, Raised Median

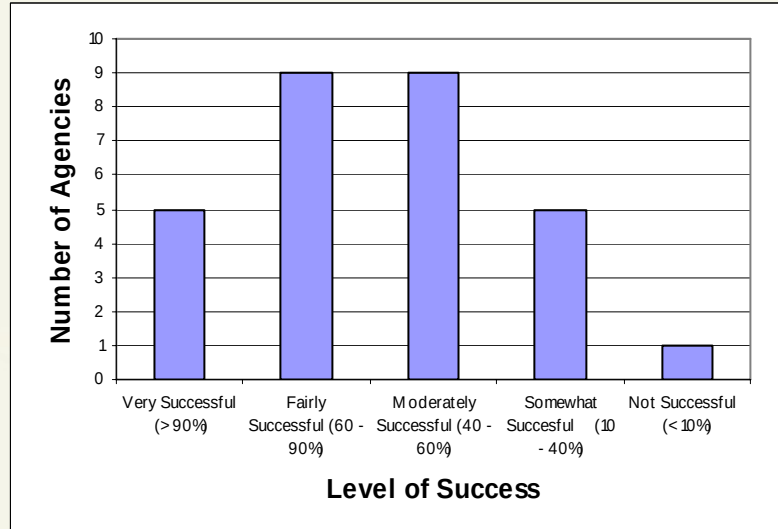


New vs. Retrofit Interchange Projects

New Interchange Projects



Retrofit Interchange Projects



Findings

- **Good examples, varied approaches**
- **Areas for improvement**
 - Established regulations/legislation at all agency levels
 - Planning approaches considering land use from a dynamic perspective
 - Public involvement
- **Needed research**
 - Proper accounting of access spacing factors
 - Universal measurement protocols
 - Operational and safety performance data
 - Definitional standards (Surrounding environment, Classification, & Interchange level of importance)
 - Design Speed-Access Spacing relationship



Special Thanks!

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Questions!

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